

CLAIMS

1 1. (currently amended) A method for synthesizing an auditory scene, comprising the steps
2 of:

3 (a) dividing an input audio signal into a plurality of different frequency bands; and
4 (b) applying two or more different sets of one or more spatial parameters to two or more of
5 the different frequency bands in the input audio signal to generate two or more synthesized audio signals
6 of the auditory scene, ~~wherein for each of the two or more different frequency bands, the corresponding~~
7 ~~set of one or more spatial parameters is applied to the input audio signal as if the input audio signal~~
8 ~~corresponded to a single audio source in the auditory scene.~~

1 2. (currently amended) The invention of claim 1, wherein:
2 the input audio signal corresponds to a combination of audio signals from two or more different
3 audio sources; and
4 each set of one or more spatial parameters corresponds to a different audio source in the auditory
5 scene.

1 3. (original) The invention of claim 1, wherein, for at least one of the sets of one or more
2 spatial parameters, at least one of the spatial parameters corresponds to a combination of two or more
3 different audio sources in the auditory scene that takes into account relative dominance of the two or
4 more different audio sources in the auditory scene.

1 4. (original) The invention of claim 1, wherein the input audio signal is a mono signal.

1 5. (currently amended) The invention of claim [[4]] 1, wherein the ~~mono~~ input audio signal
2 corresponds to a combination of two or more different ~~mono~~ source signals, wherein the two or more
3 different frequency bands are selected by comparing magnitudes of the two or more different ~~mono~~
4 source signals, wherein, for each of the two or more different frequency bands, one of the ~~mono~~ source
5 signals dominates the other ~~mono~~ source signals.

1 6. (currently amended) The invention of claim [[4]] 1, wherein the ~~mono~~ input audio signal
2 corresponds to a combination of left and right audio signals ~~of a binaural signal~~, wherein each different
3 set of one or more spatial parameters is generated by comparing the left and right audio signals in a
4 corresponding frequency band.

1 7. (original) The invention of claim 1, wherein step (a) comprises the step of dividing the
2 input audio signal into the plurality of different frequency bands based on information corresponding to
3 the different sets of one or more spatial parameters.

1 8. (currently amended) The invention of claim 1, wherein:
2 the input audio signal corresponds to a combination of audio signals from two or more different
3 audio sources; and
4 each set of one or more spatial parameters is applied to at least one frequency band in which the
5 input audio signal is dominated by a corresponding audio source in the auditory scene.

1 9. (original) The invention of claim 1, wherein each set of one or more spatial parameters
2 comprises one or more of an interaural level difference, an interaural time delay, and a head-related
3 transfer function.

1 10. (original) The invention of claim 1, wherein:
2 step (a) further comprises the step of converting the input audio signal from a time domain into a
3 frequency domain; and
4 step (b) further comprises the step of converting the two or more synthesized audio signals from
5 the frequency domain into the time domain.

1 11. (currently amended) The invention of claim 1, wherein the two or more synthesized
2 audio signals comprise left and right audio signals ~~of a binaural signal~~ corresponding to the auditory
3 scene.

1 12. (currently amended) The invention of claim 1, wherein the two or more synthesized
2 audio signals comprise ~~[[two]]~~ three or more signals of a multi-channel audio signal corresponding to the
3 auditory scene.

1 13. (currently amended) The invention of claim 1, wherein:
2 the input audio signal is a mono signal;
3 each set of one or more spatial parameters corresponds to a different audio source in the auditory
4 scene;
5 step (a) comprises the steps of:
6 (1) converting the mono signal from a time domain into a frequency domain;
7 (2) dividing the converted mono signal into the plurality of different frequency
8 bands based on information corresponding to the sets of one or more spatial parameters;
9 each set of one or more spatial parameters is applied to at least one frequency band in which the
10 input audio signal is dominated by a corresponding audio source in the auditory scene;
11 each set of one or more spatial parameters comprises one or more of an interaural level
12 difference, an interaural time delay, and a head-related transfer function;
13 the two or more synthesized audio signals comprise left and right audio signals ~~of a binaural~~
14 ~~signal~~ corresponding to the auditory scene; and
15 step (b) further comprises the step of converting the left and right audio signals from the
16 frequency domain into the time domain.

1 14. (original) The invention of claim 13, wherein the mono signal corresponds to a
2 combination of two or more different mono source signals, wherein the two or more different frequency
3 bands are selected by comparing magnitudes of the two or more different mono source signals, wherein,
4 for each of the two or more different frequency bands, one of the mono source signals dominates the
5 other mono source signals.

1 15. (currently amended) The invention of claim 13, wherein the mono signal corresponds to
2 a combination of left and right audio signals ~~of a binaural signal~~, wherein each different set of one or
3 more spatial parameters is generated by comparing the left and right audio signals in a corresponding
4 frequency band.

1 16. (currently amended) A machine-readable medium, having encoded thereon program
2 code, wherein, when the program code is executed by a machine, the machine implements a method for
3 synthesizing an auditory scene, comprising the steps of:
4 (a) dividing an input audio signal into a plurality of different frequency bands; and
5 (b) applying two or more different sets of one or more spatial parameters to two or more of
6 the different frequency bands in the input audio signal to generate two or more synthesized audio signals
7 of the auditory scene, ~~wherein for each of the two or more different frequency bands, the corresponding~~

8 set of one or more spatial parameters is applied to the input audio signal as if the input audio signal
9 corresponded to a single audio source in the auditory scene.

1 17. (currently amended) An apparatus for synthesizing an auditory scene, comprising:
2 (a) means for dividing an input audio signal into a plurality of different frequency bands;
3 and
4 (b) means for applying two or more different sets of one or more spatial parameters to two or
5 more of the different frequency bands in the input audio signal to generate two or more synthesized audio
6 signals of the auditory scene, ~~wherein for each of the two or more different frequency bands, the~~
7 ~~corresponding set of one or more spatial parameters is applied to the input audio signal as if the input~~
8 ~~audio signal corresponded to a single audio source in the auditory scene.~~

1 18. (currently amended) An apparatus for synthesizing an auditory scene, comprising:
2 (1) an auditory scene synthesizer configured to:
3 (a) divide an input audio signal into a plurality of different frequency bands; and
4 (b) apply two or more different sets of one or more spatial parameters to two or
5 more of the different frequency bands in the input audio signal to generate two or more synthesized audio
6 signals of the auditory scene, ~~wherein for each of the two or more different frequency bands, the~~
7 ~~corresponding set of one or more spatial parameters is applied to the input audio signal as if the input~~
8 ~~audio signal corresponded to a single audio source in the auditory scene; and~~
9 (2) one or more inverse time-frequency transformers configured to convert the two or more
10 synthesized audio signals from a frequency domain into a time domain.

1 19. (currently amended) A method for processing two or more input audio signals,
2 comprising the steps of:
3 (a) converting the two or more input audio signals from a time domain into a frequency
4 domain;
5 (b) generating a set of one or more auditory scene parameters for each of two or more
6 different frequency bands in the two or more converted input audio signals, ~~where each set of one or~~
7 ~~more auditory scene parameters is generated as if the corresponding frequency band corresponded to a~~
8 ~~single audio source in an auditory scene; and~~
9 (c) combining the two or more input audio signals to generate a combined audio signal.

1 20. (original) The invention of claim 19, wherein:
2 the two or more input audio signals are mono signals corresponding to different audio sources in
3 the auditory scene;
4 each set of one or more auditory scene parameters corresponds to an audio source that dominates
5 the other audio sources in the corresponding frequency band; and
6 the two or more input audio signals are combined in the time domain to generate the combined
7 audio signal.

1 21. (currently amended) The invention of claim 19, wherein:
2 the two or more input audio signals are left and right audio signals ~~of a binaural signal;~~
3 each set of one or more auditory scene parameters is generated by comparing the left and right
4 audio signals in the corresponding frequency band;
5 ~~the combined audio signal is generated by performing auditory scene removal on the left and~~
6 ~~right audio signals in the frequency domain based on the two or more sets of one or more auditory scene~~
7 ~~parameters; and~~
8 further comprising the step of converting the combined audio signal from the frequency domain
9 into the time domain.

1 22. (currently amended) A machine-readable medium, having encoded thereon program
2 code, wherein, when the program code is executed by a machine, the machine implements a method for
3 processing two or more input audio signals, comprising the steps of:

4 (a) converting the two or more input audio signals from a time domain into a frequency
5 domain;

6 (b) generating a set of one or more auditory scene parameters for each of two or more
7 different frequency bands in the two or more converted input audio signals; ~~where each set of one or~~
8 ~~more auditory scene parameters is generated as if the corresponding frequency band corresponded to a~~
9 ~~single audio source in an auditory scene; and~~

10 (c) combining the two or more input audio signals to generate a combined audio signal.

1 23. (currently amended) An apparatus for processing two or more input audio signals,
2 comprising:

3 (a) means for converting the two or more input audio signals from a time domain into a
4 frequency domain;

5 (b) means for generating a set of one or more auditory scene parameters for each of two or
6 more different frequency bands in the two or more converted input audio signals; ~~where each set of one~~
7 ~~or more auditory scene parameters is generated as if the corresponding frequency band corresponded to a~~
8 ~~single audio source in an auditory scene; and~~

9 (c) means for combining the two or more input audio signals to generate a combined audio
10 signal.

1 24. (currently amended) An apparatus for processing two or more input audio signals,
2 comprising:

3 (a) a time-frequency transformer configured to convert the two or more input audio signals
4 from a time domain into a frequency domain;

5 (b) an auditory scene parameter generator configured to generate a set of one or more
6 auditory scene parameters for each of two or more different frequency bands in the two or more
7 converted input audio signals; ~~where each set of one or more auditory scene parameters is generated as if~~
8 ~~the corresponding frequency band corresponded to a single audio source; and~~

9 (c) a combiner configured to combine the two or more input audio signals to generate a
10 combined audio signal.

1 25. (original) The invention of claim 24, wherein:

2 the two or more input audio signals are mono signals corresponding to different audio sources in
3 the auditory scene;

4 each set of one or more auditory scene parameters corresponds to an audio source that dominates
5 the other audio sources in the corresponding frequency band; and

6 the combiner operates in the time domain.

1 26. (currently amended) The invention of claim 24, wherein:

2 the two or more input audio signals are left and right audio signals ~~of a binaural signal;~~

3 each set of one or more auditory scene parameters is generated by comparing the left and right
4 audio signals in the corresponding frequency band;

5 ~~the combiner is configured to perform auditory scene removal on the left and right audio signals~~
6 ~~in the frequency domain based on the two or more sets of one or more auditory scene parameters; and~~

7 further comprising an inverse time-frequency transformer configured to convert the combined
8 audio signal from the frequency domain into the time domain.

1 27. (new) The invention of claim 1, wherein, for each of the two or more different
2 frequency bands, the corresponding set of one or more spatial parameters is applied to the input audio
3 signal as if the input audio signal corresponded to a single audio source in the auditory scene.

1 28. (new) The invention of claim 1, wherein the input audio signal corresponds to a
2 combination of three or more audio signals of a multi-channel signal, wherein each different set of one or
3 more spatial parameters is generated by comparing at least two of the audio signals in a corresponding
4 frequency band.

1 29. (new) The invention of claim 1, further comprising decompressing a compressed audio
2 signal to generate the input audio signal.

1 30. (new) The invention of claim 19, wherein each set of one or more auditory scene
2 parameters is generated as if the corresponding frequency band corresponded to a single audio source in
3 an auditory scene.

1 31. (new) The invention of claim 19, wherein:
2 the two or more input audio signals are three or more audio signals of a multi-channel signal; and
3 each set of one or more auditory scene parameters is generated by comparing at least two of the
4 audio signals in the corresponding frequency band.

1 32. (new) The invention of claim 19, further comprising compressing the combined audio
2 signal to generate a compressed audio signal.

1 33. (new) The invention of claim 19, wherein the combined audio signal is generated by
2 performing auditory scene removal on the input audio signals in the frequency domain based on the two
3 or more sets of one or more auditory scene parameters.

1 34. (new) The invention of claim 19, wherein the combined audio signal is generated by
2 averaging the input audio signals.

1 35. (new) A bitstream comprising a combined audio signal and a plurality of auditory scene
2 parameters, wherein:
3 the combined audio signal is generated by combining two or more input audio signals; and
4 the auditory scene parameters are generated by:
5 converting the two or more input audio signals from a time domain into a frequency
6 domain; and
7 generating a set of one or more auditory scene parameters for each of two or more
8 different frequency bands in the two or more converted input audio signals.